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## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) is proposing to implement a Facilities Revitalization Project (FRP) at the Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee (Figure 1-1). The FRP would be accomplished through a cooperative effort between DOE, the State of Tennessee, and private entities. The goal of this collaboration is to modernize some ORNL facilities, maintain ORNL's competitive research and development (R&D) capabilities, to enhance worker health and safety, and to reduce operating costs. DOE is preparing this environmental assessment (EA) as part of the decision-making process to assess potential environmental impacts of the project in accordance with the *National Environmental Policy Act* (NEPA) of 1969.

Four alternatives are evaluated in this EA (see Chapter 3 for more detailed descriptions).

- Alternative 1 - No Action, ongoing operations would continue, no new FRP buildings would be constructed, and no remodeling would be conducted. Ongoing operations would include research and development (R&D) activities, projects with already completed NEPA reviews, general maintenance, repairs and other types of "landlord" projects.
- Alternative 2 - Remodel, actions would be limited to remodeling six existing buildings; no new FRP facilities would be constructed. Five aging buildings would be deactivated and maintained in a safe, "cheap-to-keep" mode (see Appendix A for explanation of terms), and four of these would be potentially demolished under Alternative 2. ORNL staff currently housed in the facilities that would be deactivated would be relocated to the remodeled facilities. The ongoing operations included under Alternative 1 would also continue under Alternative 2.
- Alternative 3 - Brownfield, the Preferred Alternative, the FRP would include constructing new facilities on Brownfield land and remodeling numerous existing facilities in order to relocate ORNL staff currently housed at the Y-12 National Security Complex, other Oak Ridge Reservation (ORR) facilities, and in commercial office space from aging, inefficient facilities to new or remodeled facilities. The new and remodeled facilities would enhance research capabilities and

worker safety, while operating more efficiently. Approximately 167,225 square meters (m<sup>2</sup>) [1.8 millionsquare feet (ft<sup>2</sup>)] of space in aging buildings, mostly at the Y-12 National Security Complex, would be deactivated. Up to six buildings would potentially be demolished. The ongoing operations included under Alternative 1 would also continue under Alternative 3.

The conceptual plans for the FRP under Alternative 3 include construction of up to 24 new facilities totaling approximately 111,484 m<sup>2</sup> (1.2 million ft<sup>2</sup>) in research and support space (see Table 3.3-3). The proposed Brownfield areas for the new construction are in Bethel Valley near the main ORNL entrance, near the West Portal in Melton Valley, near the West Portal, and within the recently established footprint for the Spallation Neutron Source (SNS) facility. Some of the new construction would be funded by the State of Tennessee and the private sector. Up to 20 hectares (ha) (50 acres) of Brownfield property in Bethel Valley could be transferred from DOE to the private sector in support of this proposed action.

- Alternative 4 - Greenfield, the FRP would include the same construction, remodeling, deactivation, demolition, and staff relocation as just described for Alternative 3. New construction would still occur in Melton Valley as described under Alternative 3, and one of the facilities would still be constructed at the SNS site as under Alternative 3. However, construction of most new facilities, and all potential land transfers, would be on Greenfield land. The potential Greenfield area for the new construction would be in Bethel Valley near the main ORNL entrance and to the north of Bethel Valley Road. As under Alternatives 2 and 3, the ongoing operations included under Alternative 1 would also continue under Alternative 4.



## **1.1 ORNL BACKGROUND**

### **1.1.1 ORNL History**

The precursor to ORNL, Clinton Laboratories, was established in an isolated east Tennessee valley during World War II to support the Manhattan Project. The wartime role of ORNL was to find a way to produce and separate plutonium, one of two candidate materials for use in a fission bomb. The plutonium was produced in a pilot-scale graphite reactor. The Oak Ridge Graphite Reactor was the world's second nuclear reactor and the first isotope production reactor. Following World War II, ORNL's mission broadened to include other isotope separation techniques as well as reactor design, development, and applications.

The Atomic Energy Commission assumed responsibility for ORNL in 1947. The Commission granted ORNL additional facilities for basic research in biology [Environmental Sciences Building (1978)], chemistry, physics, metallurgy, and health physics related to the atomic energy program. Additional laboratory facilities were used for R&D in the production and use of stable and radioactive isotopes. Nuclear science education and training programs also were established. ORNL earned a reputation as the home of "large scale science" based on the design, construction, and operation of facilities such as the Tower Shielding Facility (TSF) (1954), the High-Flux Isotope Reactor (HFIR) (1965), and the Holifield Heavy Ion Research Facility (1975). Progressive programs were also developed in metallurgical research and high-energy and solid-state physics (ORNL 1994b).

ORNL came under the direction of the DOE in 1978. The laboratory added programs in energy conservation, fossil fuels, and environment, safety, and health (ES&H) fields related to energy production and use. Social and informational sciences became an integral part of ORNL. During the 1980s, ORNL became DOE's largest multi-program laboratory and remains a world leader in reactor technology, reactor safety, and isotope R&D. A number of unique facilities have been added including the High Temperature Materials Laboratory (1987) and the Roof Research Center (1988). Cooperative research with other agencies and universities evolved during this period resulting in many awards and patents.

### **1.1.2 ORNL Today**

Today, ORNL is the Nation's largest and most diverse energy R&D institution in the DOE laboratory complex. It remains a DOE multi-program laboratory, supported primarily by DOE Office of Science (DOE-SC) research programs, but with other significant sponsors from the Department of Defense, the National Aeronautics and Space Administration, the U.S. Environmental Protection Agency (EPA), the National Science Foundation, and the Nuclear Regulatory Commission.

The main ORNL site (also commonly referred to as X-10 ) encompasses facilities in two valleys (Bethel and Melton) on approximately 1,720 ha (4,250 acres) of land within the ORR. ORNL research facilities are also located on other parts of the more than 8,498 ha (21,000 acres) for which ORNL is responsible, including some at the nearby Y-12 National Security Complex and field research areas. At the Y-12 National Security Complex, ORNL staff occupy approximately 418,064 gross m<sup>2</sup> (4.5 million gross ft<sup>2</sup>) of building space. The majority of these buildings were constructed during and immediately after World War II, with some 80 percent of the buildings exceeding 30 years of age, and nearly 54 percent being more than 40 years old.

## **1.2 ENVIRONMENTAL REVIEW AND STAKEHOLDER PARTICIPATION**

Environmental reviews and stakeholder participation are required under many regulatory programs. Previous environmental reviews conducted under NEPA and the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) for other projects in the vicinity of the FRP activities are of interest to this assessment because these projects may contribute to cumulative impacts of the FRP. Previous stakeholder recommendations for land use at the ORNL and the ORR are also relevant to the FRP because the alternatives in this assessment may affect land use.

### **1.2.1 NEPA Review**

As a Federal agency, DOE must comply with NEPA by considering potential environmental impacts associated with its proposed actions in the decision-making process. The Council on Environmental Quality

(CEQ) promulgated regulations to implement NEPA [40 *Code of Federal Regulations* (CFR) 1500 et seq.] and directed Federal agencies to develop their own implementing regulations for NEPA. DOE regulations (10 CFR 1021) provide additional direction for conducting NEPA reviews of proposed DOE activities. This EA has been prepared in accordance with both CEQ and DOE regulations and with DOE Orders and guidance (e.g., DOE Order 451.1B). Stakeholder participation is an integral component of the NEPA process. Prior to the release of this EA for public comment, the Preferred Alternative was discussed with numerous stakeholder organizations, and an open house (November 2, 2000, Oak Ridge, Tennessee) was held to encourage early input from the public. An additional public meeting will be held during a 45-day comment period for this EA.

### **1.2.2 *Comprehensive Environmental Response, Compensation, and Liability Act Review***

As a result of past practices in handling and managing hazardous substances used in the pursuit of its various missions, many facilities and the surrounding environment at ORNL became contaminated. The ORR was placed on the National Priorities List (NPL) under CERCLA on November 21, 1989. Subsequently, DOE, EPA, and the Tennessee Department of Environment and Conservation (TDEC) signed a Federal Facilities Agreement for environmental restoration of ORR, effective January 1, 1992. The ORR status as an NPL site directly affects some aspects, such as land transfer, that are considered under the alternatives in this EA.

Stakeholder participation is an integral component of the CERCLA process, just as it is for NEPA. A *DOE Secretarial Policy on NEPA* was issued in June 1994 to streamline the NEPA process. One provision in this policy was that DOE would rely on the CERCLA process for review of actions to be taken under CERCLA and address NEPA values and public involvement procedures as further provided in the policy. This includes incorporation of NEPA values into CERCLA documents to the extent practicable. Environmental reviews and decisions related to clean-up levels and on the disposition of contaminated facilities are accomplished through that program.

### 1.2.3 Environmental Reviews of Interest to this Assessment

Environmental reviews that describe other projects having potential cumulative impacts with the FRP or that provide guidance or decisions related to the FRP include NEPA documentation, CERCLA documentation, and reports by ad hoc stakeholder groups.

***Construction and Operation of the Spallation Neutron Source Environmental Impact Statement (DOE/EIS-0247).*** The Final EIS was issued in April 1999 (DOE 199a) and the Record of Decision (ROD) on June 18, 1999 (64 FR 35140). A supplement to the EIS was issued on February 23, 2000. Four DOE alternative sites for construction and operation of a new SNS facility were evaluated in this document. A site near ORNL that is accessed from Bethel Valley Road was selected, and the SNS facility is currently under construction. Up to three new facilities are proposed for construction at this SNS site as part of the alternatives considered in this EA. The potential for cumulative impacts from the SNS project are considered in this assessment.

***Environmental Assessment for Selection and Operation of the Proposed Field Research Centers for the Natural and Accelerated Bioremediation Research (NABIR) Program (DOE/EA - 1196) (DOE 2000a).*** A Finding of No Significant Impact (FONSI) was issued on April 18, 2000. The EA evaluated impacts of operating a field research component of the NABIR Program at two alternative sites, the ORNL/Y-12 Site and the Pacific Northwest National Laboratory/DOE Hanford 100 - H area in Richland, Washington. The ORNL/Y-12 Site was selected as the site for the field research component. The mission of the NABIR Program or the potential environmental impacts from the operation of the Field Research Center are not expected to change over the 10-year period evaluated for the FRP.

***Final Report of the Oak Ridge Reservation End Use Working Group, End Use Recommendations (SSAB 1998).*** The End Use Working Group is a subcommittee of a local stakeholder advisory group, the Site Specific Advisory Board (SSAB), that contributed recommendations on clean-up levels and end uses for specific contaminated areas as well as a broader set of community use guidelines for the ORR, including Bethel Valley. These included recommendations for siting facilities on Brownfield, rather than Greenfield land.

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***The Common Ground Process - A Report to the U.S. Department of Energy on Recommended Future Uses of the Oak Ridge Reservation (LMES 1995).*** DOE Oak Ridge Operations Office (DOE-ORO) requested public perspectives on future ORR land use through a process called Common Ground. As part of the Common Ground process, the Nature Conservancy was retained to assess the biological significance of land areas on the reservation. The Common Ground process resulted in citizen recommendations to DOE for land use designations that included Conservation Use Areas, Conservation Transition Area Use, Primary Industrial Area Uses, Primary Industrial Area Uses, and Secondary Industrial Area Uses.

***Architectural/Historic Assessment of the Oak Ridge National Laboratory, Oak Ridge Reservation, Anderson and Roane Counties, Tennessee (ORNL 1994a).*** An assessment was conducted by DOE to identify any properties included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) at ORNL. Numerous individual properties were identified as eligible for inclusion in the NRHP, and in addition, an ORNL Historic District was defined. This assessment was approved by the Tennessee State Historic Preservation Office (SHPO) and an agreement between DOE and the state outlining roles and responsibilities with respect to consultations for cultural resources on ORR was subsequently signed.

***Architectural/Historic Evaluation of the Y-12 Plant, Oak Ridge Reservation, Anderson and Roane Counties, Tennessee (Thomason 1999).*** An assessment was conducted by DOE to identify any properties included in, or eligible for inclusion in, the NRHP at Y-12. Numerous individual properties were identified as eligible for inclusion in the NRHP, and in addition, a Y-12 Historic District was proposed. Two buildings at Y-12 have been proposed for National Historic Landmark status, Building 92-4-3 and Building 9731. The assessment was approved by the Tennessee SHPO, and an agreement between DOE and the state regarding consultation processes is in place.

***Remedial Investigation/Feasibility Study for the Bethel Valley Watershed at the Oak Ridge National Laboratory, Oak Ridge, Tennessee (DOE/OR/01-1748&D2)*** (DOE 1999b and c). A Remedial Investigation/Feasibility (RI/FS) Study for Bethel Valley was issued in May 1999 (DOE 1999a). A Proposed Plan (DOE/OR/01-1795&DOE) on remediation of the Bethel Valley watershed was issued



October 2000 (DOE 2000e). A ROD is expected to be finalized in the spring of 2001. The Bethel Valley watershed is the area of ORNL that would be most directly affected by the FRP activities evaluated in this assessment.

***Report on the Remedial Investigation of the Melton Valley Watershed at the Oak Ridge National Laboratory, Oak Ridge, Tennessee (DOE/OR/01-1546&D2).*** A Remedial Investigation report for Melton Valley was issued in August 1998 (DOE 1998b). The Feasibility Study that accompanies the Remedial Investigation was issued in June 1999 (DOE/OR/01-1629&D2) (DOE 1999e). A ROD for remediation of the Melton Valley watershed was finalized in August 2000. The Melton Valley watershed is in the valley parallel to Bethel Valley and contains some facilities potentially affected by the FRP activities evaluated in this assessment.

***Environmental Restoration Footprint Reduction Process - Evaluation of Central Chestnut Ridge Study Area (DOE/OR/01-1639&D1).*** The Footprint Reduction Report for the East Chestnut Ridge Study Area was issued in January 1998 (DOE 1998a). This report describes investigation results for the area north of Bethel Valley Road and up the southwest side of Chestnut Ridge to determine if any potential areas of contamination are present. The majority of the study area, including the representative Greenfield Site for the FRP in Alternative 4 and the SNS site, was cleared – with the exception of groundwater – and a No Further Investigation recommendation was accepted by the EPA in February 1998.

***Report on the Remedial Investigation of the Upper East Fork Poplar Creek Characterization Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee (DOE/OR/01-1641&D2).*** A Remedial Investigation report for the Upper East Fork Poplar Creek (UEFPC) was issued in August 1998 (DOE 1998c). The Feasibility Study that accompanies the Remedial Investigation was issued in June 1999 (DOE/OR/01-1747&D2) (DOE 1999d). A ROD on remediation of the UEFPC watershed is being prepared and is scheduled to be finalized in June 2001. The ORNL facilities at Y-12 are located within the UEFPC characterization area.

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***Draft Site-wide Environmental Impact Statement for the Oak Ridge Y-12 National Security Complex (DOE/EIS-0309).*** A Draft EIS for ongoing and planned operations for Defense Programs (DP) missions at the Y-12 National Security Complex was issued for public review on December 22, 2000 (DOE 2000f). The Y-12 National Security Complex has been the primary site for enriched uranium processing and storage and one of the manufacturing facilities for maintaining the U.S. Nuclear Weapons Stockpile since the 1950s. The Draft EIS evaluates environmental impacts associated with continued operations, as well as the construction and operation of new facilities for two of Y-12's missions, Highly Enriched Uranium Storage and Special Materials. The modernization of Y-12 facilities to ensure our Nation's capability to meet future stockpile needs in the post-Cold War era are actions that could contribute to cumulative impacts for the ORNL FRP.

***Transuranic Waste Treatment Facility Environmental Impact Statement (DOE/EIS-0305).*** A Final EIS for this facility was issued June 2000 and the ROD was issued on August 9, 2000 (65 FR 48683) (DOE 2000b). DOE selected a Low-Temperature Drying Alternative and is proceeding with the construction, operation, and decontamination and decommissioning (D&D) of the Transuranic (TRU) Waste Treatment Facility in Melton Valley at ORNL. All treated TRU waste will then be transported and disposed of at the Waste Isolation Pilot Plant while treated low-level waste will be transported and disposed of at the Nevada Test Site.

### **1.3 SCOPE OF ENVIRONMENTAL ASSESSMENT**

This EA will address several alternatives for potential changes to facilities that may occur over the next 10 years. These changes are needed to continue and/or enhance on-going research mission activities at ORNL. The alternatives involve remodeling or deactivating some existing facilities, constructing new facilities, relocating staff and equipment, and transferring ownership of some land. The alternatives do not include changes to the research missions or process operations. Therefore, process operations for research missions are not the focus of this evaluation and are only discussed if potentially affected by changes to the facilities. Actions addressed under CERCLA, such as environmental restoration and D&D, as well as actions that have already been reviewed under NEPA, are not within the scope of this EA. CERCLA requirements [CERCLA Section 120 (h)] that directly impact any transfer of federally-owned land within NPL boundaries are discussed.